

AMATEUR SATELLITE REPORT

AMSAT's Newsletter for the Amateur Space Program.



Amateur Satellite Report is endorsed by the
American Radio Relay League as the special interest
Newsletter serving the Amateur Radio Satellite Community

Number 108
August 25, 1985

Editor: Vern Riportella, WA2LQQ
Contr. Editor: Harold Winard, KB2M
Managing Editor: Bob Myers, W1XT
Copyright 1985 by Amateur Satellite Report

Autumn Operating Schedule Previewed

A new AO-10 operating schedule will be put into effect during the first week of September according to ZL1AOX. The new schedule will mark the end of the severe eclipses experienced during August. The new schedule (final details pending) will be in effect for about 5 weeks until mid-October when a "normal" schedule will be implemented.

A preliminary estimate of the new schedule was given by ZL1AOX as follows:

PRELIMINARY ESTIMATE	B	040 - 189
Schedule Beginning	L	190 - 206
on or about 5 Sep 85	B	207 - 220
	Off	221 - 039

Estimated Attitude: 230 longitude, -15 latitude

PRELIMINARY ESTIMATE	B	040 - 119
Schedule Beginning	L	120 - 136
on or about 15 Oct 85	B	137 - 220
	Off	221 - 039

Estimated Attitude: 210 longitude, -10 latitude
at first; then
190 longitude, 15 latitude
with further refinements
expected later.

ZL1AOX emphasized that these are PRELIMINARY estimates and further work needs to be accomplished to refine the plan. The actual schedule implemented may resemble but probably will not be exactly the ones cited above. ZL1AOX is working with VE1SAT and DJ4ZC to check and refine the plan for the AO-10 operating schedule.

For latest developments, listen to the RTTY and/or CW bulletins on 145.810, the Mode B General Beacon or 436.040, the Mode L Engineering Beacon.

OSCARs 24 and 30

Launched; Not AMSAT's

The U.S. Navy launched two satellites into low polar orbits in early August. The satellites are named OSCAR 24 and OSCAR 30 (objects 15935 and 15936 respectively). These are not Amateur Radio satellites and are not related to AMSAT OSCARs. The Navy has previously called some of its satellites OSCAR. In addition, the Advanced Research Projects Agency (ARPA) of the U.S. government announced plans about two years ago for an experimental space-to-submarine satellite system also using the name OSCAR. AMSAT does not hold any copyright or trademark rights on the name.

AMSAT To Meet In Colorado

The Third Annual Space Symposium and the AMSAT Annual Meeting have been tentatively set for Vail, Colorado according to Project Leader Molly Hardman, N3CHZ. AMSAT was in the final stages of negotiations with the Westin Hotel in Vail at presstime.

While a few details need to be finalized with the hotel, it would appear Saturday, 9 Nov. 85 will find hundreds of satellite folks descending on this famous ski resort in the Colorado Rocky Mountains. Plans call for the Space Symposium to be an all-day affair with featured papers presented by experts from around the world. A call for papers has been issued by Ms. Hardman. Letters of intent and/or abstracts are appropriate. Molly's address is 3994 Promontory Ct., Boulder, CO 80301.

On the evening of 9 November AMSAT will hold its Annual Meeting and Awards Banquet. A truck load of prizes will be awarded as well. Topping the list of prizes awarded will be the fabulous new ICOM 1271A all-mode 1.2 GHz transceiver donated by ICOM of Bellevue, Washington.

The new Directors will be announced and introduced as well at the Annual Meeting and various officers will make presentations.

The Autumn Board of Director's meeting will be held in Vail on Sunday, 10 November.

European Spacelab-Shuttle Mission Includes Ham-In-Space

Three European Radio Amateurs will be aboard the space shuttle this November and they plan to operate the third ham-in-space project. Two Germans and one Dutch astronaut will fly along with the European Spacelab D1 mission tentatively scheduled for 7 November.

Dr. Ernst Messerschmidt, DG2KM, Dr. Reinhardt Furrer, DD6CF of the Federal Republic of Germany and Dr. Wubbo Ockels (callsign unknown) of Netherlands will be aboard Spacelab D1. They will operate under the callsign DP0SL (Spacelab) using a Mode B type transponder built by the German Bosch Company. (See ASR 105, July 9, 1985).

The transponder was tested during a five-hour flight aboard a German aircraft piloted by the two German Astronauts Saturday, 17 Aug. Launched at 0908 UTC, the flight included several hundred contacts with hams across northern Europe. Flying under the call DF0LRK/AM, the flight was believed to be the first authorized German aeronautical mobile ham operation.

According to G3IOR, the operational frequencies are similar to a Mode B transponder. The frequencies are:

Uplinks	Downlinks
437.125 MHz	145.450 MHz
437.175	145.475
437.225	145.550
437.275	145.575
437.325	
437.375	

It is believed each uplink and downlink can be independently selected. FM operation is the preferred mode. Operational plans for the November flight have not been announced.

Changes In Operations and New Services Department Announced

AMSAT Headquarters recently announced the following re-organization within the Operations directorate. Appointed Acting Vice President for Operations (VP-O) is Julian Macassey, N6ARE, of Pasadena, California. Julian replaces John Champa, K8OCL, in the role of Acting VP-O. Julian has been active in Southern California for many years and has been responsible for thousands of dollars in fund raising through his orbital prediction program. He is active on AO-10, is an Electrical Engineer and consultant.

Stepping into the new position of Assistant Vice President for Operations (AVP-O) for Field Operations is Mike Crisler, N4IFD, of Miami, Florida. Mike will oversee the function of over 100 Area Coordinators and staff and play a key role in planning and supporting hamfest and conventions across the nation. Mike is active on AO-10 and recently operated maritime mobile on AO-10 from Bermuda.

Rick Dittmer, WH6AMX, of Honolulu continues in the AVP-O/Spacecraft Operations role and Jim McKim, W0CY continues as AVP-O/Administration.

Jack Somers, WA6VGS, of Los Angeles has been promoted to AVP-Public Affairs reporting to the Executive Vice President, John Champa, K8OCL. This is a new position. Jack had been Chief Area Coordinator. He joins Joe Berman, N8ATB, in the Public Affairs department.

A new position has been established in recognition of the important role Member Services plays in the satisfaction of members. The new slot is the Vice President for Member Services (VP-MS). Doug Loughmiller, KO5I, of Paris Texas has been named to fill the position. Doug has recently returned to active status having returned to Texas and re-established his station. He had been VP-O until a year ago when he moved East. Doug was recently married and he and his wife Jane expect to attend the Annual Meeting and



Mission specialist John-David Bartoe's back is seen via Amateur SSTV from Shuttle mission 51F. Image was received by WB0GAI in Greeley, Colorado using a Robot 450C SSTV unit.



A book floats by another Mission Specialists head on 51F. Photo of SSTV image by WB0GAI.

The Phase 3C Team



Phase 3C team in Colorado pose for photo in Boulder 28 July. They had just received their Center of Excellence charter from President WA2LQQ (left to right): WD0HHU, KE3D, W0VO, W3GEY, AA0L, WA0VSL, WB0RLY, WB9QDL, Regina Henrisly, K0RZ, W1XE, NF0U.

Space Symposium in Vail.

The new VP-MS function will have at least a five separate AMSAT agencies and bureaus to oversee. Included are AMSAT Nets (Net Manager W8GQW); QSL Bureau (WB8OTH, Manager); Videotape Library, (N1CHM, Manager); AMSAT Software Exchange (N4HY, Manager); AMSAT DX Bureau (WA2RDE, Manager). In addition, two new bureaus are in the offing. An Awards Program Manager will be named shortly as will a AMSAT Boutique Manager. The former will oversee the development and functioning of AMSAT's various operating awards and coordinate with other award-issuing organizations. The latter will help develop various AMSAT memorabilia, tokens and premiums such as special AMSAT jewelry, leisure wear, flags, etc.

Other projects starting up in the very new future include a Twenty-Fifth Anniversary Celebration Project to commemorate 25 years of OSCARS. (1986 is the 25th anniversary of OSCAR-1). Also, a 1986 AMSAT Yearbook is planned.

Short Bursts

- The first mobile-to-mobile operation using AO-10 has recently been reported by G3IOR. According to Pat, G4CUO worked G3PXT using AO-10 at 1600 UTC on 19 August. The frequency of the SSB QSO was 145.957 MHz. Both were using less than 10 watts ERP and exchanged 5 by 6 reports. Others joining in were W4BE and WA2RDE.
- Press clippings, photographs and other documentary matter relating to the recent 51F ham-in-space mission of W0ORE are requested by NASA and AMSAT to support efforts for further, more ambitious missions in the future. Please send to WA2LQQ, P.O. Box 177, Warwick, NY 10990.
- The Autumn Mode B Bulletin schedule on AO-10 will commence September 15. The season begins with a bulletin session at 0200 UTC on that date. Further schedules will

be announced as the AO-10 operating schedule is firmed up.

- The next series of ZRO Engineering Award tests will commence in late September or early October as the new schedule allows.

- Nominees for Director are: KG6LC, N6ARE, NK6K, WA5ZIB, W6SP, W3GEY, VE2VQ and KE3D. Ballots will be sent soon. Please mail back promptly.

- In five days of order-taking by telephone ending 23 August, TAPR had sold 600 TNC-2 boards. (See 107, August 12, 1985). Earlier in the week the telephone traffic was sufficient to seriously impair the Tucson commercial telephone trunks.

- The RS satellites have returned to service. However, RS-8 appears to be in trouble as it emerges from its recent series of eclipses. The Russian controllers are reported to be having trouble keeping it turned on. Battery problems and radiation damage are the prime suspects. RS-5 and 7 are doing well with RS-7 pulling robot duty recently. All three Russkies should be on regularly until about 1 Oct. 85.

- Publication of the *AMSAT Technical Journal* has been postponed. It had been planned to issue the Journal in December. It is now anticipated to be issued in early 1986 with papers presented at the Third Annual Space Symposium in Vail, Colorado, included.

- The Society for the Promotion of Amateur Radio Communications (SPARC) will hold its 1st Annual swapmeet and packet exhibit on October 19 at the Lee County Fairgrounds on US 431 just north of the US 29 Junction in Opelika, Alabama. Times are from 10:00 am to 5:00 PM. Spaces \$5.00 per vehicle in advance, \$7.00 at the gate. \$1.00 gas donation. Free parking. Packet, ACSSB demonstrations conducted by Robert "Bob" McGwier, N4HY. Refreshments available. Reservations contact: Ray P.O. Box 2423, Opelika, AL 36803-2423. Information call Ray 105/745-2838, Gene 205/821-8010, Danny 205/745-7455. Talk in on 147.06/66.

ASR Mini-Tutorial #2

The second in a series of compact explanations to puzzles encountered in the fascinating world of Amateur satellites and Amateur space activities. This time we examine the relation between nodal period and anomalistic period.

When all OSCARS were in circular orbits, we learned about orbital periods. They were easy to measure. The period was simply the time between two successive north-going or south-going equator crossings. For convenience, we said that the north-going passage or ascending portion of the orbit would form the reference. So our definition of period was simply the time interval between two successive ascending nodes, that is, equator crossings on a north-bound trek. This became known as the nodal period. For AMSAT-OSCAR 8 it is about 103 minutes; for RS5 it's about 120 minutes.

Recently, with the advent of AMSAT-OSCAR 10, we've been exposed to the complicating influence of another variable in orbit geometry: varying height above the earth. This comes about by design. We desired an elliptical orbit to provide the best coverage possible with a single satellite.

With the elliptical orbit, however, comes a new, different kind of period. Sure, the elliptical or Molniya orbit has a nodal period, but with Molniya orbits and other elliptical orbits it just makes more sense to keep track of them using a different reference. That reference is the time between successive perigees. We call it the anomalistic period. We could just as well have established the time interval between successive apogees but for various reasons AMSAT uses the perigee reference scheme.

The anomalistic period is what is provided in the AO-10 orbital predictions provided here in ASR. Ever wonder about the relation between nodal period and anomalistic period? We did and so we asked Dr. Martin Davidoff, K2UBC, to help us understand the difference. Marty is the author of the very popular "Satellite Experimenter's Handbook", an ARRL publication available at AMSAT HQ.

Step-by-step Procedure for Calculating Nodal Period from Currently Published Orbital Element Sets

Prepared by: M. Davidoff, K2UBC, 12 June 1985

METHOD

Step 1. Add "Mean Motion" (see latest orbital element set) to W_o "rate of change of argument of perigee in revolutions per day" (see Table I).

Step 2. Take inverse of result of Step 1. You now have nodal period in units of days per orbit.

Step 3. Multiply previous answer by 1440 minutes per day. Result is nodal period in minutes per orbit.

EXAMPLE: OSCAR 11

Step 1. $14.61956704 + (-0.008681) = 14.6108860$

Step 2. $1/(14.6108860) = 0.06844212$

Step 3. $(0.06844212)(1440) = 98.55665$ minutes/orbit

NOTE

Results will be slightly more accurate (at least one additional significant digit) if you calculate "rate of change of argument of perigee" directly from latest set of orbital elements. See *Satellite Experimenter's Handbook* page 8-8, Eq. 8.12. Results for nodal period should only be trusted to 5 or 6 significant digits due to approximations inherent in model.

TABLE 1. All calculations based on orbital element sets listed in ASJ No. 4, May-June 1985.

Satellite	Anomalistic period (minutes)	W_o (deg/day)	W_o (rev/day)	Nodal period (minutes)
OSCAR 9	94.294556	-3.513	-0.009758	94.35485
OSCAR 10	699.510692	0.2628	0.0007300	699.26272
OSCAR 11	98.498129	-3.125	-0.008681	98.55665
RS-5	119.497145	-2.050	-0.005693	119.55363
RS-7	119.137036	-2.064	-0.005734	119.19358
RS-8	119.705456	-2.041	-0.005670	119.76191
NOAA-7	101.900326	-2.813	-0.007815	101.95671
NOAA-9	102.028983	-2.818	-0.007827	102.08560

Project OSCAR Donates \$1,000 For Phase 3C

Project OSCAR has once again supported a major spacecraft construction project. In a recent letter to AMSAT President WA2LQQ, Project OSCAR President Dr. John Pronko, W6XN, writes:

"Dear Rip:

As President of Project OSCAR Inc. I am pleased to announce that the sale of the Project OSCAR Orbital Predictions has, as in past years, been a successful fund raiser. In addition to the proceeds from the sale of those calendars which Project OSCAR has donated to AMSAT and were (or will be) sold at various ham fests and conventions, a check made out to AMSAT for \$1000.00 is enclosed. Project OSCAR will leave it to the officers of AMSAT to decide how the donation could best be used to enhance the effectiveness of the amateur radio satellite program.

Sincerely,

John G. Pronko, W6XN
President of Project OSCAR Inc.
P.O.B. 1136
Los Altos, CA 94022"